A Catalogue of the Stars of the IV. Type. By T. E. Espin.

The following catalogue contains all the stars of type IV. known up to the present time. In addition to those given by Dr. Dunér (*Sur les étoiles à spectres de la troisième classe*, p. 22) there are those detected by Pechüle (*Expédition danoise pour l'observation du passage de Vénus*), by Konkoly (*Spectroskopische Beob. der Sterne zwischen* 0° *und* −15° *bis zu* 7·5*ter Grösse*), and by myself. The places have been brought up to 1890, and are taken (1) from *Dunsink Observations*, part iv., containing the "Mean Places of 321 Red Stars;" (2) from the D.M. and Südl. D.M.; and (3) from the *Catalogo General Argentino*. In a few cases the stars are not found in any catalogue of star places, and consequently the places must be considered as more or less approximate. The magnitudes are from the D.M. and Südl. D.M., and for stars still farther south from the *Catalogo General Argentino*, and when the star is in none of these from the original observations. In passing I may note that the magnitudes of red stars as seen in the 17¼-inch Reflector are higher than those of the D.M. In column five the following abbreviations are used: Secchi=Se.; D'Arrest=D'A.; Vogel=V.; Pechüle=Pe.; Pickering=Pi.; Dunér=Du.; Konkoly=K.; while my own observations are marked Es.

The mean magnitudes of the stars observed are as follows:—

Secchi*	...	...	6·7
D'Arrest*	..	...	7·0
Vogel*	...	...	7·1
Pechüle	...	...	7·3
Pickering	...	...	8·4
Dunér*	...	...	8·3
Espin	...	...	8·8

Of the 113 stars 29 only are south of the Equator. This, on the supposition of equal distribution in the northern and southern hemispheres, would make a total of 168 stars of type IV. in the whole heavens above the mean magnitude of 8·8. The number of them may be considered as fairly complete down to −21°, since from the Catalogue it will be found that from +0° to +21° there are 21, and from −0° to −21° there are 21. Many of the stars in the Catalogue are variable to the extent of a magnitude and with no regular period. The leading star of this class of variable is 19 *Piscium*.

* Dunér, *Sur les étoiles*, &c., p. 125.

No.	Schj., D.M., &c.	α 1890 h m s	δ ° ′	Mag.	Auth.	Note.
1	Schj. 3	0 14 5	+44 5·9	8·2	Du.	
2	+34°·56	21 42	+34 59·7	8·1	Du.	
3	+57°·165	48 22	+57 57·9	9·5	Es.	
4	Schj. 7	1 10 5	+25 11·3	7·0	D'A.	
5	Es. 230	26 27	+57 11·2	9·8	Es.	
6	+51°·575	2 19 12	+51 34·1	9·0	Es.	
7	+56°·724	42 22	+56 31·5	9·4	Du.	
8	+57°·647	42 51	+57 23·7	8·9	Du.	
9	+57°·702	3 2 57	+57 29·1	7·9	Pi.	
10	+47°·783	6 1	+47 26·5	9·0	Es.	
11	Schj. 27*a*	32 21	+62 17·5	7·0	Du.	
12	+61°·667	56 18	+61 32·0	7·5	Es.	
13	Schj. 41	4 39 49	+67 58·4	7·0	Se.	
14	+21°·702	41 14	+21 57·8	9·4	Es.	
15	+34°·911	41 59	+34 48·4	8·8	Es.	
16	+15°·691	44 19	+15 36·4	9·4	Es.	
17	Schj. 43	44 38	+28 20·3	8·1	Se.	
18	+38°·955	45 6	+38 18·9	8·8	Es.	
19	+22°·770	47 12	+22 35·5	9·2	Es.	
20	R Leporis	54 36	−14 58·3	var.	V.	
21	+38°·1010	55 48	+38 54·6	9·5	Es.	
22	Schj. 51	59 43	+ 1 1·5	6·0	Se.	
23	−5°·1174	5 3 24	− 5 39·3	8·7	Du.	Birm. 99
24	+35°·1046	11 48	+35 40·4	8·9	Es.	
25	+32°·957	14 49	+32 23·7	9·3	Es.	
26	S Aurigæ	19 51	+34 3·2	var.	Du.	
27	+7°·929	27 17	+ 7 3·8	8·2	Es.	
28	+68°·398	29 7	+68 44·3	9·3	Es.	
29	Schj. 64	38 29	+24 22·3	8·5	Du.	
30	Schj. 64*a*	39 6	+20 38·9	7·7	Du.	
31	Schj. 65	40 10	−46 30·2	7½	Pe.	
32	Schj. 64*c*	41 3	+30 35·4	8·5	Es.	
33	Schj. 72	6 4 3	+26 2·1	7·4	D'A.	
34	Schj. 73	6 38	+27 11·8	9·0	Du.	
35	+33°·1290	10 1	+33 14·6	9·1	Es.	
36	Es. 160	13 26	+47 44·6	8·7	Es.	
37	+3°·1214	16 36	+ 3 28·8	9·0	Es.	
38	+25°·1250	17 5	+25 4·2	9·5	Es.	
39	Schj. 74	19 12	+14 46·9	6·5	D'A.	

No.	Schj., D.M., &c.	α 1890 h m s	δ ° ′	Mag.	Auth.	Note.
40	Es. 243	6 19 44	+19 9·7	9·4	Es.	
41	+3°·1381	38 54	+ 3 25·7	9·3	Pi.	
42	Es. 247	46 59	− 7 0·5	8·8	Es.	
43	+6°·1462	52 30	+ 6 18·8	8·0	Es.	
44	−3°·1685	55 31	− 3 6·0	7·7	Es.	
45	Schj. 88	7 1 37	− 7 23·3	8·3	Es.	
46	Schj. 89	2 55	−11 45·6	7·6	Se.	
47	+14°·1594	6 13	+14 53·5	9·0	Es.	
48	+48°·1504	9 57	+48 42·0	9·0	Es.	
49	+25°·1641	13 55	+25 11·6	9·0	Es.	
50	−3°·1886	19 24	− 4 0·9	8·7	Es.	
51	−2°·2101	19 47	− 2 54·5	9·0	Es.	
52	+24°·1686	25 14	+24 44·8	8·2	Es.	
53	+2°·1715	30 23	+ 2 19·0	9·3	Es.	
54	+5°·1797	42 55	+ 5 41·9	9·0	Es.	
55	−13°·2247	44 35	−13 49·2	7·2	K.	
56	Schj. 103	53 15	−49 41·2	8	Pe.	
57	Pickering 26	57 1	−12 46·6	var.	Pi.	
58	Schj. 115	8 49 11	+17 38·5	6·5	D'A.	
59	T Cancri	50 23	+20 16·2	var.	Es.	
60	+11°·1954	52 17	+11 15·5	var.	Es.	
61	Schj. 124	9 45 59	−22 30·2	7·3	Pe.	
62	Schj. 125	50 56	−41 3·9	$7\frac{1}{2}$	Pe.	
63	Schj. 126	56 23	−59 41·4	$7\frac{3}{4}$	Pe.	
64	Schj. 128	10 7 4	−34 46·7	$7\frac{1}{4}$	Pe.	
65	Schj. 130	30 20	−38 59·6	5·9	Pi.	
66	U Hydræ	32 7	−12 48·8	var.	Se.	
67	+68°·617	37 25	+67 59·1	6·2	Du.	
68	Schj. 136	46 17	−20 40·0	6·8	Se.	
69	Schj. 145	12 19 37	+ 1 22·8	8·1	D'A.	
70	Schj. 152	39 57	+46 2·5	5·5	Se.	
71	Schj. 155*b*	52 6	+66 35·4	7·3	D'A.	
72	−2°·3638	13 4 3	− 2 47·9	8·3	K.	
73	V Coronæ	15 45 36	+39 54·2	var.	Du.	
74	V Ophiuchi	16 20 36	−12 10·6	var.	Du.	
75	Schj. 202	17 23 14	−19 23·0	7·8	Du.	
76	Schj. 205	38 29	−18 36·5	8·5	Du.	
77	+4°·3779	18 25 6	+ 4 18·6	9·5	Es.	
78	+36°·3168	28 32	+36 54·9	8·5	Du.	

No.	Schj., D.M., &c.	α 1890 h m s	δ ° ′	Mag.	Auth.	Note.
79	−7°·4633	18 31 7	− 7 41·4	9·0	Es.	
80	+36°·3243	39 1	+36 51·3	7·5	Du.	
81	Schj. 219	43 57	− 8 1·8	7·1	Du.	
82	Schj. 221	51 56	+ 0 18·6	9·2	Es.	
83	Schj. 222	53 30	+14 12·9	9·0	Du.	
84	Schj. 222*c*	58 32	− 5 50·8	7·0	V.	
85	−16°·5272	19 12 51	−16 6·4	6·8	Es.	Holden 7
86	Schj. 229	25 28	+76 20·4	6·5	Se.	
87	+45°·2906	25 31	+45 49·1	8·6	Es.	
88	Schj. 228	28 1	−16 36·7	7·2	Se.	
89	+32°·3522	36 44	+32 22·8	8·0	Du.	
90	+43°·3425	53 40	+43 57·9	8·2	Du.	
91	+27°·3612	20 0 14	+20 20·2	7·8	Es.	
92	+47°·3031	6 7	+47 31·5	9·3	Du.	
93	+35°·4002	6 14	+35 37·6	9·5	Pi.	
94	Pickering 38	6 57	+35 47·1	var. (?)	Pi.	
95	+38°·3957	9 25	+38 23·8	8·7	Du.	
96	V Capricorni	10 40	−21 38·3	var.	Se.	Schj. 238
97	+37°·3876	14 28	+37 6·9	9·	Es.	
98	U Cygni	16 11	+47 32·8	var.	Du.	
99	+36°·4028	17 12	+36 33·2	9·5	Es.	
100	+37°·3903	17 24	+37 10·4	9·4	Es.	
101	+39°·4208	24 50	+39 36·7	9·2	Es.	
102	V Cygni	37 37	+47 44·9	var.	V.	
103	Es. 287	41 19	+44 27·7	8·5	Es.	
104	+45°·3271	43 7	+45 38·9	8·8	Es.	
105	Schj. 248*b*	21 18 16	+41 55·6	9·5	Du.	
106	S Cephei	36 35	+78 7·7	var.	Du.	
107	Schj. 249*a*	37 23	+35 0·5	6·2	D'A.	
108	Schj. 251	38 43	+37 30·8	7·8	Se.	
109	Schj. 257	51 8	+49 58·6	9·1	Du.	
110	+54°·2865	22 44 11	+54 31·7	8·5	Es.	
111	+58°·2586	23 18 56	+58 34·6	9·0	Es.	
112	19 Piscium	40 46	+ 2 52·6	var.	Se.	Schj.
113	+42°·4824	58 43	+42 59·6	8·6	Es.	

On a Method of Supporting a Large Mirror when Silvering.

By Edward Crossley, M.P.

On account of the recent construction of large reflecting telescopes, and their application to celestial photography, it seems important to record the means by which any difficulties in handling large mirrors have been overcome. I therefore venture to lay before the Society a description of a method of supporting and handling a 3-foot mirror when silvering. It differs from Sir Howard Grubb's method of handling a large mirror principally in having a groove in the edge of the mirror.

Two plates have cylindrical ribs fitting into the groove, with pivots on the outside; the plates are held in their places on two opposite sides of the mirror by a copper band passing over and rivetted to them. The band is cut in two at two points 90° from the pivots; the cut ends are then united by screw bolts. This renders it an easy matter to get band and ribs into their places. A stirrup with holes for the pivots to slip into is then put on; and to facilitate this the stirrup is cut in two at the top and the two halves secured by a screw bolt.

The band, pivots, plates, and ribs are of copper; the ends of the stirrup of aluminium bronze. All these are coated with silver, to protect them from the action of the silvering solution.

In the annexed figure M is the mirror, S the stirrup, p the pivots, g the groove, B the band.